

REMARKS

The present application now contains claims 1-76. Claims 43-46 are indicated as containing allowable subject matter. Claims 1-42 and 47-76 stand rejected under 35 U.S.C. §102 or 35 U.S.C. §103. Applicants note that many of the arguments provided here repeat arguments submitted in the previous response and are made with the expectation that the Examiner will reconsider them in view of the discussion of the art held at the interview.

Interview Summary

At a personal interview on February 24, 2004, applicants' representatives presented arguments that Nagashima does not describe progressive transmission, but only pyramidal storage of data. Also discussed briefly was the teaching of Doyle. In addition, two articles recently cited in the EPO were presented and distinguished over as not showing progressive transmission of a diagnostic quality image. No final agreement on any issue was made at the interview, however, applicants believe that the Examiner was convinced at least with respect to lack of progressive transmission in Nagashima.

102 rejections

Claim 64 stands rejected as being anticipated by U.S. Patent No. 5,838,906 to Doyle et al. Applicants respectfully disagree and submit the Examiner did not provide a prima facie case of anticipation. Claim 64 includes the limitation that image reconstruction software is downloaded from the same server that also provides images by request (this issue is also discussed below). Applicants respectfully submit that this limitation is not shown or suggested in Nagashima. Applicants respectfully respond to the Examiner's assertion regarding Doyle supposedly describing downloading image reconstruction software, as follows. The demo software for downloading is not provided in conjunction with requesting "specific image data". The self-extracting objects are at most decompression software, but not image reconstruction software. Also, there is no teaching in Doyle that diagnostic images are compressed in a self-extracting manner.

Claim 74 includes the limitation that the specific image data is requested after receiving the image reconstruction software and during a same session. Applicants respectfully submit that in the Doyle reference, it is not suggested that an image reconstruction software be downloaded in a same session as image data is requested and reconstructed with the software thus downloaded. Applicants respectfully submit that an install process is probably required.

Applicants also note that the software in Doyle is apparently used for image display and not for image reconstruction.

Claim 65 has the additional limitation that the image reconstruction software is used for the image requesting. This is also not shown in Doyle.

103 rejections, introduction

Applicants respectfully believe that the rejections in general are based on a misinterpretation of the art. As part of this response, applicants will show how limitations that the Examiner reads into the art are actually not present.

(a) The teaching of Doyle, as opposed to that of some claims of the present invention.

Doyle is attempting to provide good quality visualization for 3D data in spite of low processing power at the user station. His solution is to perform most of the processing at a server and use the user terminal for display related processing only. This is described, for example, in Col. 6, lines 50-62; Col. 7, lines 1-6; Col. 7, lines 6-20; Col. 7, lines 21-29; Col. 10, line 33 through Col. 11, line 16; and Col. 11, lines 17-51. Also, Col. 5, line 66 through Col. 6, line 47 present the problem to be solved.

In contrast, as will be explained below, some claims of the present invention have an opposite aim, in that the server is used to provide data and image reconstruction software, which performs non-trivial tasks, is provided at the client.

In any case, in Doyle, the purpose is to provide the user with a transparent interface such that the user is not aware of any distribution of processing. In contrast, in some embodiments of the present invention, the user is encouraged to use an extra interface, that of viewing progressively evolving images, to interact with the transmission, which is admitted to the user as being slow.

(b) The teaching of Nagashima.

Nagashima teaches that you should charge for sending data. First, you should charge by quality and second, you may charge by volume. Third, you may charge by time. In any case, a user first sets what quality he wants and then he is charged based on the quality of data and possibly volume of data actually transmitted.

The Examiner has understood Nagashima to be transmitting the data in a progressive manner. Applicants respectfully disagree. Applicants submit that Nagashima apparently stores the data using hierarchical encoding (Col. 7, lines 6-43). However, in describing the actual transmission, Nagashima uses the language of "(Col. 12, line 55) In the first operation [S1],

User L transmits a message that requests provider A to transmit image Info 1 at resolution 3 to provider A via a transmission line" and "(Col. 12, line 66) In the third operation step [S3], the transmission terminal device 1201 transmits hierarchically encoded image data Info 1 at resolution 3 to user L via the transmission line". Also, referring to the cover figure, for example, there is no component capable of combining different image layers to form a progressively reconstructed image. Applicants respectfully submit that Nagashima, once he receives a request for a certain quality and, as applicants argue, does not anywhere suggest that such a quality can be changed during submission, generates, from the hierarchically encoded data image Info 1 at resolution 3 and transmits that as a single data set. Further, applicants respectfully submit that in all of Nagashima the transmission is treated as an atomic action over which the user has no control. Instead, the storage as hierarchically encoded data is used solely for ease of generating such image Info 1 when needed, while minimizing storage requirements. In addition, applicants respectfully submit that the user is not provided with any mechanism for deciding, on the fly, if a particular image is good enough and then asking for improvement.

With respect to stopping during progressive transmission, applicants note that Nagashima does mention the possibility of terminating (not stopping) a transmission. However, the context is that of stopping a video or audio stream which the user views over time. For example, Col. 19, lines 47-50, are directed to stopping the transmission of video or audio information (Col. 19, line 8), in which progressive display is meaningless. Progressive transmission, to the end terminals described (cable TV devices) is similarly impossible absent dedicated hardware and software for reconstructing images, which is not disclosed or even hinted at. In another example, Col. 36, line 53, the data is charged for by time (Col. 36, line 35). Col. 35, line 43 shows that in each unit time multiple frames (e.g., of final resolution) are provided. In this case, as the data is encrypted (and no element for image reconstruction from layers is provided) progressive transmission is again impossible as is progressive display when multiple frames are shown per second.

This is in distinct contrast to what is said below regarding advantages of progressive transmission, which allow a user to make decisions on the fly.

Applicants also respectfully submit that streaming data is not the same as progressive transmission, as this term is used in the art.

(c) Whether Doyle and Nagashima (US Patent No. 6,275,988) would be combined, for medical images.

In Doyle, a user knows exactly what image he wants and at what quality. This image is requested from the server in an interactive manner. Great effort is taken to ensure that the image be provided as fast as possible. In contrast, Nagashima uses layered storage (and even in the Examiner's view, layered transmission) in order to simplify a method of charging different amounts for different quality images. A person using Doyle would not want to decide for each image what quality he desired. And, if he did need to ask for a certain quality (for some reason), he would request the server application to send the data with that quality. Not only is there no reason to combine Nagashima with Doyle, but, applicants submit, that such combining would slow down the operation of Doyle in an unacceptable manner. In any case, in medical image viewing, as opposed to general transmission of image data, it was accepted at the time of filing of this application that the best quality image always be used and not some ill-defined lower quality representation.

It should also be noted that in Nagashima the data is stored in layers. In Doyle, in contrast, the data is created on the fly and there would be no motivation to do an extra step of dividing the data into layers, just to do accounting. Other accounting methods which are less computational intensive would be used instead.

It should also be noted that the Examiner has not explained how Nagashima would be used with a repeatedly interactive method such as Doyle.

Special utility

Applicants also note that some limitations of the present invention have a special and unexpected utility for medical images, which was not suggested or expected in view of the art.

(a) The special utility of using progressive and interactive transmission.

Applicants have discovered that even though, a priori, a full scale full resolution medical image may be needed for diagnosis, a much lower quality image could be used to determine which part(s) of the whole image are actually of interest. While the resolution at which such determination can be made may not be known in advance, sending an image in a progressive manner allows a user to stop the transmission (and save bandwidth) once the image is good enough for him. Then, more exact image retrieval instructions, which require reduced bandwidth as compared to the whole full quality image, may be used. Such a lower quality image may also be used to allow a physician to start his diagnostic work by setting up parameters interactively (e.g., window level) or start actual processing, like zoom, pan or apply

graphic tools. Applicants submit that this is a non-trivial discovery for the field of medical images.

(b) The special utility of operating in a single session and/or single server.

Applicants have discovered that a considerable flexibility and ease of use may be achieved if users can download software for selecting and processing images, on the fly and without performing any installation process. In particular, this is in contrast to prior methods where such software needed to be installed, or where applet-type software was used to provide user interface only and not processing ability. An example of this prior method can be found in Doyle, on Col. 11, line 52 through Col. 12, line 8, where software (apparently installed and not an applet program) is used to enhance the ability to interact with a browser.

Using a single server for images and reconstruction software also adds some ease of use, as the typical user is not computer savvy and might not be working from a same terminal at all times.

103 rejections, specific

In the following discussion, applicants note that dependent claims are patentable for at least the reason of being dependent on a patentable independent claim. However, applicants have also argued some of the dependent claims. Not all the dependent claims were argued, in order to simplify the examination process, however, applicants reserve the right to make such arguments later.

Claims 1-36 and 47-63 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Doyle, in view of Nagashima. Applicants respectfully disagree, as detailed below.

Re claim 1

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as there is no motivation to combine Nagashima with Doyle. This is discussed above as general comments. In addition, applicants respectfully submit that claim 1 includes the limitation that image reconstruction software is downloaded from the same server that also provides images by request (also discussed in the general comments). Applicants respectfully submit this limitation is not shown or suggested in either Doyle or Nagashima.

Re claim 2

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 2 includes the limitation of using the received software for image processing and Doyle does not.

Re claim 3

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 3 includes the limitation of receiving an image selection software used for the requesting, which applicants submit is not shown by Doyle, who does not receive such a software.

Re claim 4

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 4 includes the limitation that the image selection software controls the transmission of image data, while in Doyle, any software only initiates the transmission. In addition, applicants note that in Nagashima the transmission is controlled by the server.

Re claim 6

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 6 includes the limitation that the image reconstruction software and the image selection software are downloaded together. This is not shown in Doyle. Applicants current understudying of Doyle is that the browser itself of Doyle is used for selecting which image to work on.

Re claim 7

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 7 includes the limitation that the image reconstruction software and the image selection software comprise a single software unit, while in Doyle, the image selection is via a browser which is a separate software unit from the client application (used to add functionality to the browser via a special API).

Re claim 8

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 8 includes the limitation that said image selection software is operative to stop the transmission of the data, after at least a low quality image is reconstructed and viewed from said data. This is contrary to applicants' understanding of Nagashima where only one image is reconstructed for the user and that image is the image requested at the quality requested, which, in Doyle, would be a high quality image. See also the general discussion above.

Re claim 9

Applicants respectfully object to the Examiner's official notice regarding distributing movies over the network. Applicants argue that there is no motivation to use (and modify) tools originally defined for playing (in time) video on demand movies (even if such tools were known) for the purpose of controlling quality of a progressively transmitted image. However, the fact that the Examiner did not provide any specific art makes it more difficult to explain this argument or to argue against the motivation. In any case, applicants respectfully submit that applying such VCR controls to displaying of a progressively displayed image is in itself an invention. Applicants also respectfully submit that Nagashima might be provided with such a control for showing a whole movie, but not for the transmission of a single image, which is apparently atomic (i.e., indivisible) to the user.

Applicants also respectfully submit that VCR controls do not fit in with Doyle's project at all, in which the user knows exactly what image he wants and the sole purpose of the remote computer is to enhance the local computer by providing processing power and storage ability. In such a situation (of having only a local computer) a user would not complicate the 3D manipulation of an image, by adding another set of VCR controls for quality.

Re claims 11 and 24

Applicants object to the Examiner's official notice that numerous other compression techniques were known at the time the invention was made. This has no bearing on the matter, except possibly to show (in the applicants' favor) that selecting a particular technique might be a patentable and non-obvious selection. With regard to whether Doyle would use a bit reduction technique, applicants respectfully submit that Doyle actually teaches away from such a technique, by suggesting that the MPEG or JPEG methods be used (or other "appropriate

methods"), in which a user is not expected to perceive a significant difference. Generally, to achieve any meaningful compression in the bit reduction technique, a perceived image quality must be significantly affected. Further, applicants respectfully submit that Doyle, who generates an image mean to be transmitted over a communication line, would not desire that such a generated image be possibly damaged by bit reduction.

Applicants do not see why or how Cushman would be combined with Doyle and/or Nagashima.

Re claim 13

Applicants have read the cited section and still do not understand the Examiner's argument. Doyle seems to say that the whole (view) is transmitted. Applicants respectfully note that in Doyle, the image might be a 3D data set, and since that was already transmitted, only the current 2D view (still a whole display/image and generally not a subset of the original image data per se) is sent. In contrast, claim 13 contains the limitation that the image selection software controls the server to selectively transmit only portions of the image data (from which a local reconstruction is made).

Re claims 14-17

Applicants object to the Examiner's official notice that device independent programming was well known. Applicants respectfully submit that any such programming was NOT used for processing and was instead used for computationally-weak activities, such as user interface. Applicants respectfully submit that Gosling does not show using such software for image processing. On this basis, applicants respectfully submit that Doyle, who teaches reducing processing needed at the client computer would have provided a compiled program which executes faster and thus requires fewer computational resources than device independent network programming languages. Instead, in Doyle, a wide variety of client machines are supported using a common language, such as "C", as provided for example in Appendix B of Doyle.

Re claims 18-23 and 25

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 18 and claim 19 both include the limitation of using the produced improved images to decide on processing of the images. Nagashima merely uses the volume

transferred to decide on accounting and does not use the images to decide on processing of the images. Applicants have noted above (general discussion) that it is not clear how or why Doyle would show an evolving image and no teaching to do so. Applicants disagree with the interpretation that usage of frames as in Doyle is progressive updating. Rather, that is replacement of one image by another.

In addition, claim 18 includes the limitation that the processing is gray-level windowing, not described by Nagashima (nor mentioned in the rejection). Therefore, no prima facie case is provided by the Examiner.

In addition, claim 19 includes the limitation of interactively selecting regions of interest. Applicants cannot see how this reads on recursively adding layers (to the whole image and not interactively), supposedly taught by Nagashima. Applicants respectfully submits that a region of interest is not at all related to layers, in which a layer covers the whole image. Therefore, no prima facie case is provided by the Examiner.

Claim 21 contains similar limitations to claim 19. Therefore, no prima facie case is provided by the Examiner.

Claim 22 contains similar limitations to claims 18 and 19. Therefore, no prima facie case is provided by the Examiner.

Claim 23 contains similar limitations to claim 21 and also a limitation that transmission is stopped. As argued above, this limitation is not found, nor obvious in view of Nagashima. Therefore, no prima facie case is provided by the Examiner.

Claim 25, contains limitations similar to those of claim 21 and also a limitation that processing (which applicants argue is not found in Nagashima) comprises selecting a region of interest. Therefore, no prima facie case is provided by the Examiner.

Re claim 27

As noted in the arguments for claims 11 and 24, applicants respectfully submit that such reducing is not taught by Doyle or Nagashima and would not be practiced by either of them. Therefore, no prima facie case is provided by the Examiner. In any case, applicants submit that such reducing would not be in response to a request by a user

Re claim 29

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 29 includes the limitation that the reduction of bit-per-pixel ratio is

performed responsive to a user input of selection of an image portion. This limitation is not taught by the cited art.

Re claims 30-31

Applicants again object to the use of official notice. In particular, applicants do not understand what the fact that many algorithms were known has to do with the specific claim limitations. Thus, applicants cannot answer this rejection better without a specific art reference to argue the specific claim limitations. However, applicants note that since Nagashima only shows a final quality image he would have no motivation to provide smooth transitions. Therefore, no prima facie case is provided by the Examiner.

Re claim 32

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 32 includes the limitation of starting with the layer with the least amount of data to enable a user to view a progressively improving image to decide on further transmission. Applicants cannot find this limitation in the art or in the Examiner's argument. Claim 32 has been amended for clarity, its scope has not been changed.

Re claim 34

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 34 includes the limitation of discarding alternate rows and columns, which is not shown in Col. 7, lines 21-38.

Re claims 37-40

Claims 37-40 stand rejected under Doyle & Nagashima and further in view of Ward (U.S. Patent No. 5,793,735). Applicants respectfully disagree and submit that the Examiner has not shown a prima facie case of obviousness. Applicants respectfully submit that Ward is not directed to compression at all, only to converting images from interlaced to non-interlaced versions. As such, Ward does not de-correlate the data spatially (claim 37) or temporally (claim 38). The Abstract, Col. 3 and Col. 4, lines 5-35 are all directed to filters, not decorrelators. Col. 4, lines 46-55 is directed to an auxiliary data stream and applicants do not see its relevance except that this video transmission protocol has some similarity to the MPEG

transmission (not compression) protocol. Ward does suggest that the input data may be an already compressed MPEG stream.

In addition, applicants see no motivation for wanting in Doyle or Nagashima to have a smooth presentation of images of the type suggested by Ward.

Re claim 51

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 51 includes the limitation of using the postage images as a catalog, which neither Nagashima nor Doyle would use, as they only transmit and select for transmission one image at a time. In any case, the Examiner has not explained and applicants do not understand how the claim limitation would be incorporated into the Examiner's proposed combination.

Re claim 52

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claim 52 includes the limitation that the postage stamps are a lowest pyramid level. Applicants respectfully submit this is not shown in Doyle or in Nagashima.

Re Claim 53

Applicants did not understand the rejection. As far as can be understood, applicants point out that Nagashima stores (or as Examiner contends, sends) layers of differences, while claim 53 sends whole images. At least for the reason that this method apparently uses more bandwidth, Nagashima would not want to do this. Therefore, no prima facie case is provided by the Examiner.

Re claims 55-59

Applicants respectfully submit that the Examiner has not provided a prima facie case of obviousness, as claims 55-57 include the limitation of segmenting into tissue parts and background parts, while Nagashima is pixel oriented and does not distinguish tissue from background. No motivation is supplied by the Examiner for this change in Nagashima's operation, which is counter productive at least for the reason of requiring additional computation.

In addition, with regard to claim 58, the issue of stopping the transmission in the middle of an image before it reached the requested quality, has been argued before by the applicants (see general discussion), in that Nagashima does not and would not provide such an ability and Doyle would have no reason to complicate the interface by allowing a user to stop transmission of an image that the user asked for.

In addition, with regard to claim 59, applicants object to the official notice. The Examiner has not met the burden of a prima facie case of obviousness because he did not show that transmitting a background portion in order to achieve a loss-less transmission, is known. Absent a specific reference, all the Examiner said was that some (unspecified) loss-less transmission methods are known. Possibly, the Examiner is relating to regular uncompressed transmission, which does not meet the claim limitation of transmitting the background part (after first transmitting the foreground part).

Re claim 60

As argued above, stopping transmission responsive to viewing is not obvious nor provided in Nagashima. In Col. 4, the user selects the quality he wants, before any transmission starts. In Col. 10, the Examiner is respectfully pointed to lines 61-64, in which it is stated that the image transmission is completed. Therefore, at least for this reason, no prima facie case is provided by the Examiner.

In addition, applicants note that Nagashima does not suggest continuing the transmission responsive to a command from a user, which limitation is also found in claim 60.

Applicants respectfully point to Col. 8, lines 1-2 and Col. 10, lines 46-47, where it is clearly noted that a user requests transmission at a particular resolution.

Re claims 61 and 62


Applicants have reviewed the sections of Nagashima cited by the Examiner and cannot find the limitations of "said transmission is modified by said user" (claim 61), "stopping said transmission stops compression of images at said server" (claim 62). Applicants respectfully submit that in Nagashima the user cannot modify a transmission once started and that to the extent that reduced resolution is considered compression, the images are pre-compressed. Therefore, at least for this reason, no prima facie case is provided by the Examiner.

Re claim 63

Applicants note that even if the Examiner were to argue that claim 60 reads on stopping a video transmission (which is not a medical image), applicants note that in such a video transmission stopping is not after a reduced-resolution representation is sent, at least since no such reduced resolution representation is sent in video.

A notice of allowance is respectfully awaited. In the event that the Examiner cannot issue such a notice, the Examiner is respectfully requested to call the undersigned at (toll free) +1 (877) 428-5468. This telephone connects directly to the undersigned's office in Israel, which is 7 hours ahead of Washington. Our normal work week is Sunday through Thursday and the undersigned is generally available until 11:00 AM, Washington time.

Respectfully submitted,
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